

STM32WB and STM32WL Wireless SoC's



All-in-one Bluetooth SoC



(G)FSK
(G)MSK
BPSK



All-in-one SubGHz SoC



RF SoC Ecosystem



STM32WB - Powerful SoC Capability

7 Keys That Make the Difference



Open 2.4 GHz Radio
Multi-Protocol



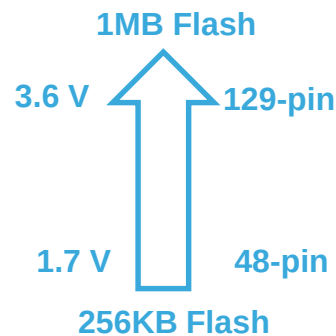
Dual-Core / Full Control
Ultra-Low-Power



IoT Protection Ready



Massive Integration
Cost Saving



A Large Offer

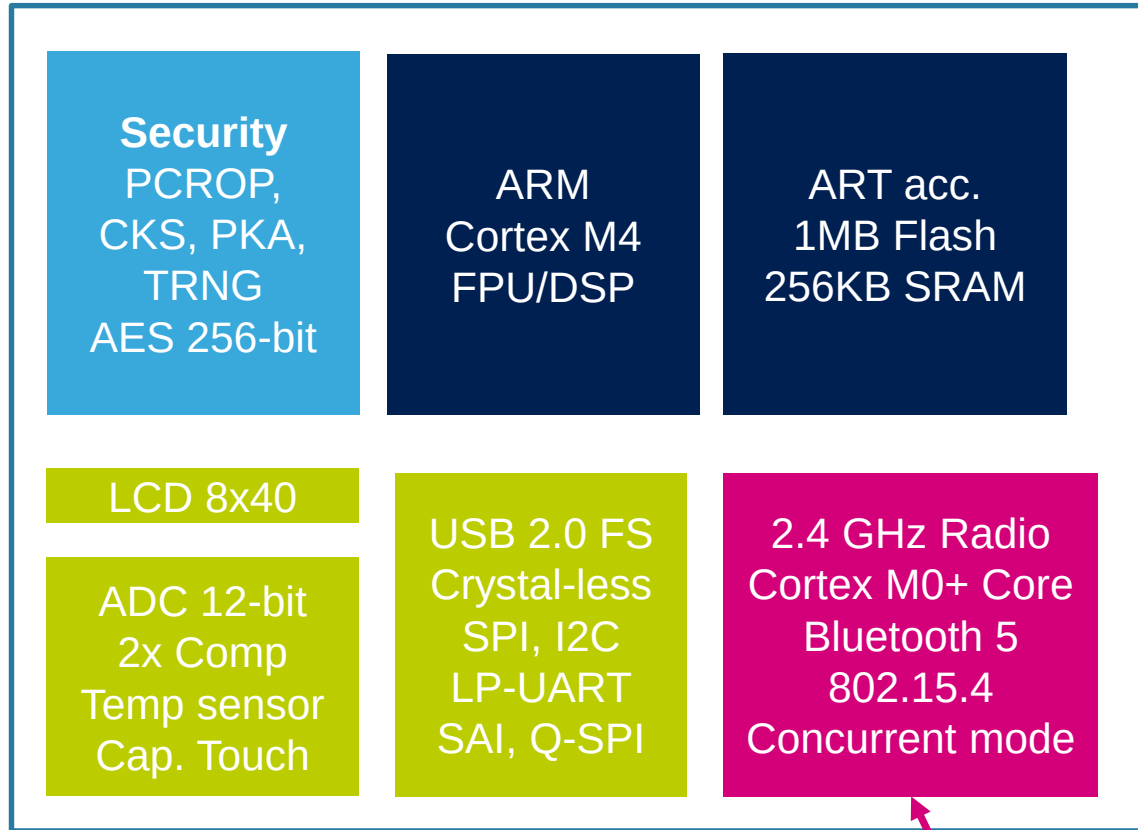


Advanced RF Tool, Energy Control
with C-Code Generation



No matter what!

STM32WB - Closer Look

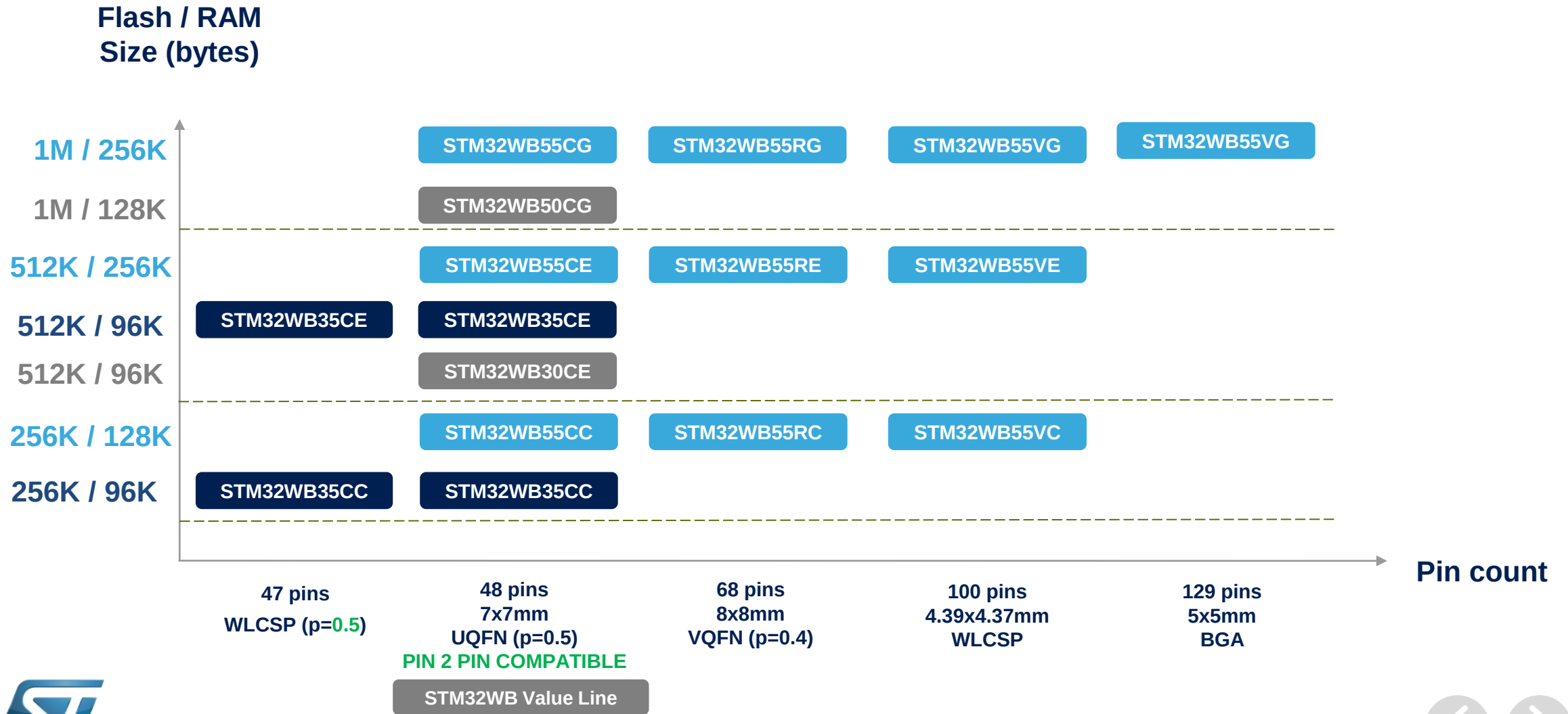


KEY FEATURES

- 2 independent cores for real-time execution
- Ultra-low-power consumption
 - 50 μ A/MHz Active mode (at 3.0V)
 - 2.1 μ A Stop mode (Radio in standby + 256KB RAM)
 - < 50 nA Shutdown mode
- Peripherals
 - 2xI²C, 1xUSART, 1xLP-UART, 2xSPI, 1x USB 2.0 FS device supporting Battery Charging Detection, 1xSAI, Q-SPI (XIP), 6x 16-bit timer (including LPWM and low-power one)
- 1.71 to 3.6V voltage range (DC/DC, LDO)
- -40°C to +105°C temperature range

Independent
Sub-system RF
2.4GHz

STM32WB Full Portfolio



STM32WB – Fits Every Need

- Robust RF link **-100dBm** sensitivity with IEEE 802.15.4 and **+6 dBm** output power
- Upgrade legacy 802.15.4 device to **Bluetooth 5.0**
- **Secure Update** Radio and stack firmware with build-in FUS
- Bluetooth 5.0 and 802.15.4 protocols **Mesh capable**

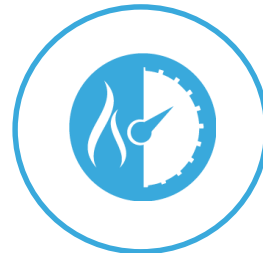


Lighting



Fleet maintenance

- Retrofit legacy product to **Bluetooth 5.0** and 802.15.4 concurrency mode
- Remotely upgrade device with **OTA capability**
- **Brand protection** with Authenticated **FW upgrade** system



Industrial devices

- **Up to 105°C**
- **External PA** support for longer distance applications
- Down to **600 nA mode with RTC** and 32KB of RAM
- Only **5µs wakeup** time over 16 wakeup lines
- PCROP, **ECC**, TRNG, **PKA**, for secure firmware
- Reduce BOM cost with **built-in LCD driver HW**



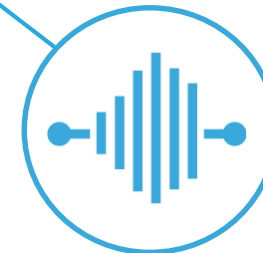
Fitness/ Healthcare

- **Multipoint** Bluetooth 5.0 connections
- Small form factor design with **CSP100 pins**
- Extended Battery with **< 50 nA** Shutdown mode
- Efficient Current Consumption **50 µA/MHz**
- External **Quad-SPI** memory support
- Large storage capacity with **1 Mbyte** of Flash
- USB 2.0 **crystal-less** operation reducing BOM costs



Beaconing

- **Beacon** profile examples provided
- **Embedded balun** to minimize design cost
- Only **5.2mA Radio TX** current to extend beacon battery life
- **Up to +6 dBm** output power
- **< 2.1 µA** Stop mode with full RAM for **battery life** optimization
- Down to 1.71V full feature capable



Home security and Audio

- **-100 dBm** sensitivity to increase distance
- **Customer Key Storage (CKS)** for secure firmware update
- Manage full duplex **audio** with embedded SAI interface
- USB FS 2.0 with Battery **Charging Detection**



STM32WB Mesh Capable

Multiple Protocol Support – Multiple Mesh Networks

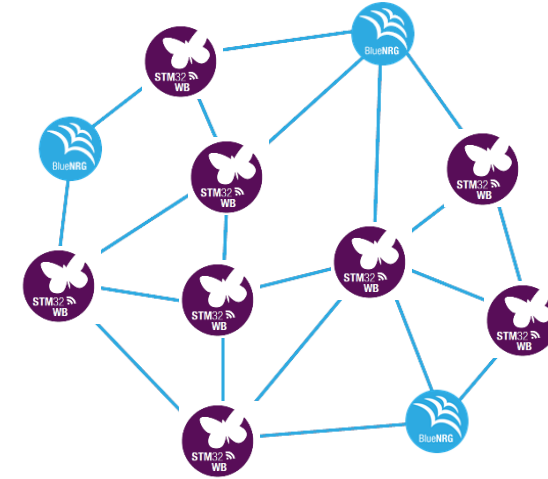


- Proven solution for the latest Bluetooth Mesh specification
- CES demos using Zigbee 3.0 in a Mesh network
- CES demo and examples of Open.Thread Mesh network
- Static and Dynamic concurrent operation of multiple protocols with STM32WB

Bluetooth Mesh And Open.Thread

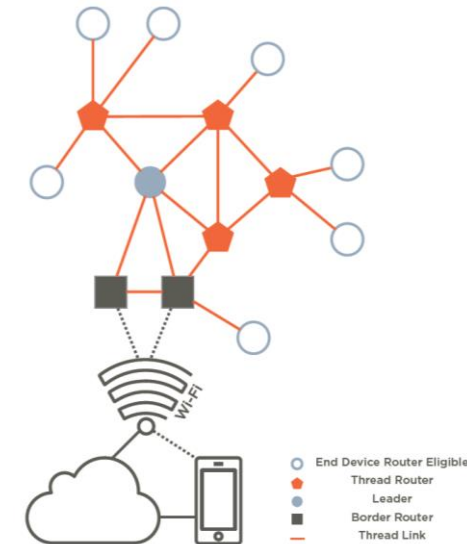
Bluetooth Mesh

- Based on Bluetooth 4.0 and later
- Broadcast type, flood the network with messages, no routing
- Shorter range, 3kbps application data rate, 1Mbps on-air bit-rate
- High power consumption

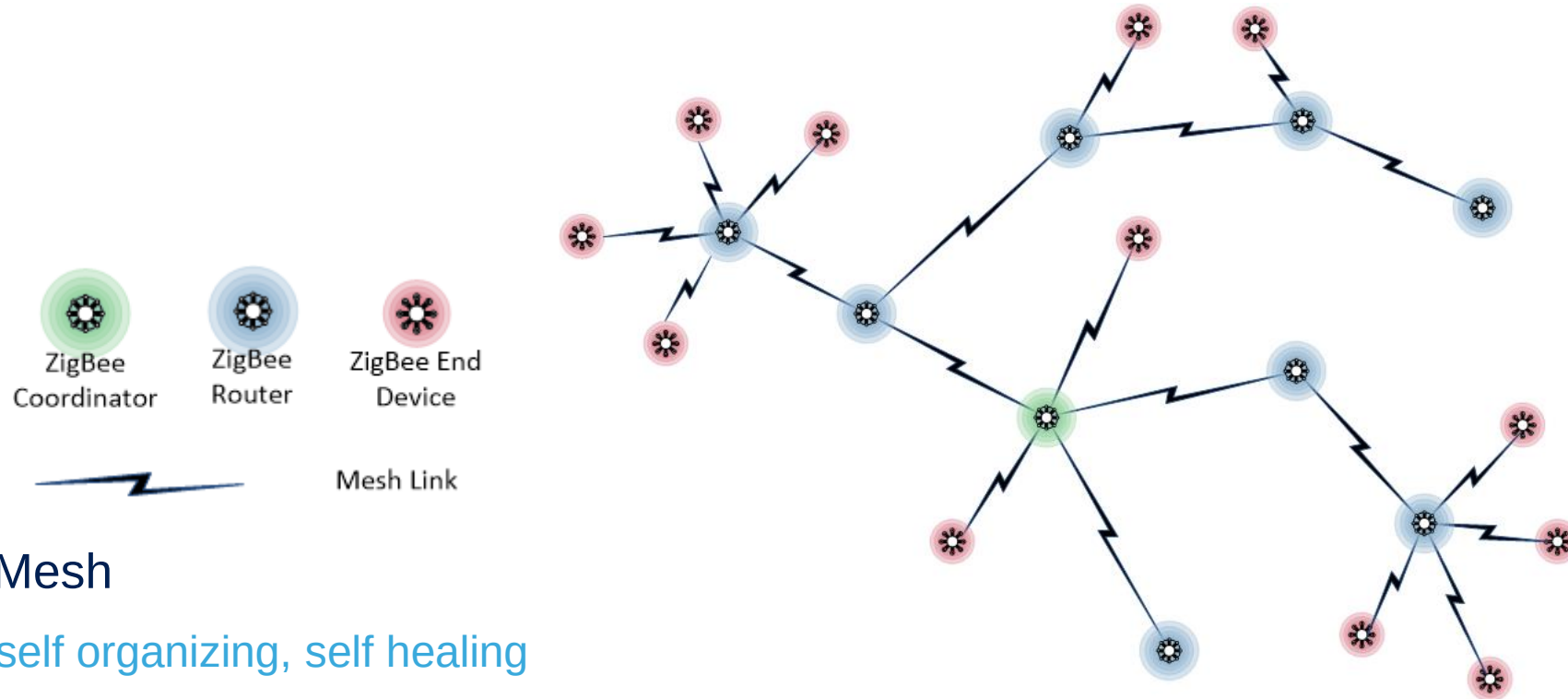


Thread

- IPv6-based using 802.15.4 MAC
- Routing table approach with network self healing
- Medium range, 40Kbps application data rate, 250Kbps on-air bit-rate
- Low power consumption



Zigbee Mesh



Zigbee Mesh

- Mesh, self organizing, self healing
- Currently deployed maximum size of 700 nodes with one coordinator
- Theoretical limit of 65,535 nodes
- Interference tolerant with channel assessments, retries, etc.
- Point-to-point range of 100m and several Km with full Mesh deployment

STM32WL – World's First!

7 Keys That Make The Difference



(G)FSK
(G)MSK
BPSK

Multi-modulation



**Massive integration
Cost saving**



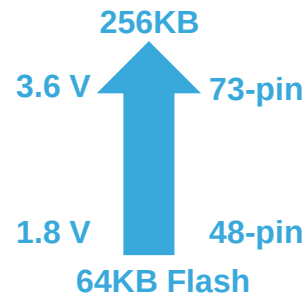
Open platform



Ultra-low-power



STM32 Security

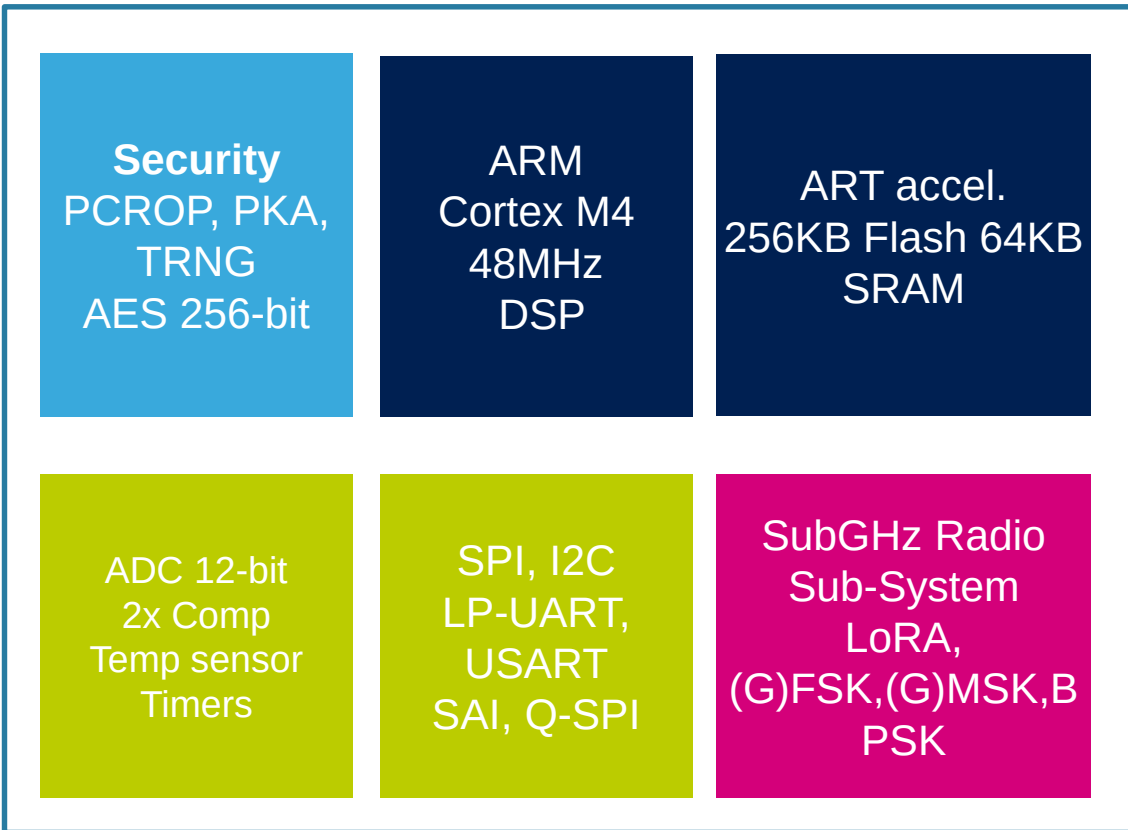


A large offer is coming



No matter what!

STM32WL – ULPower SubGHz Capability

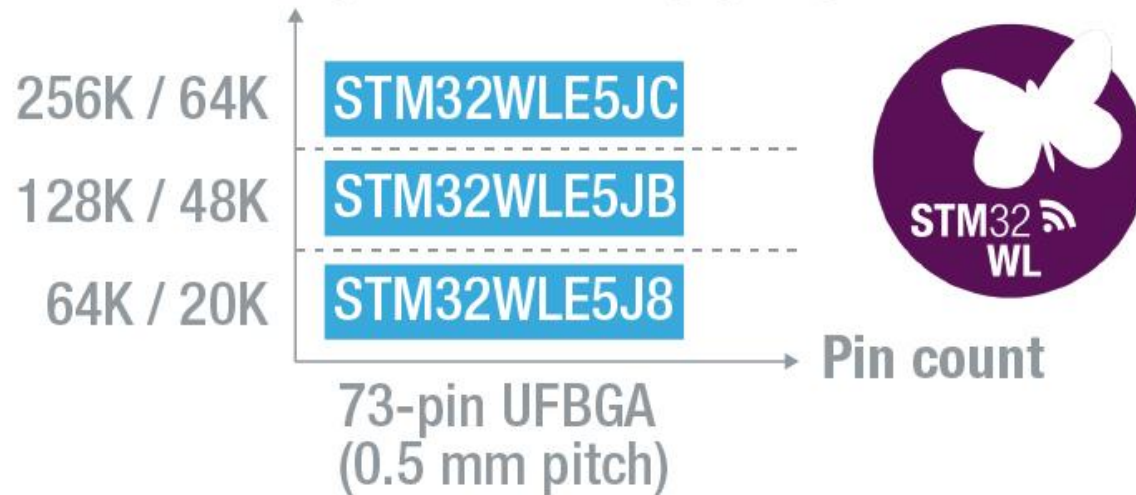


KEY FEATURES

- **Ultra-low-power consumption**
 - 63 μ A/MHz Active mode (3.0V)
 - 1.1 μ A Stop mode (Radio in standby + 64KB RAM)
 - < 40 nA Shutdown mode
- **2 Embedded Power Amplifiers**
 - +14dBm for Low Band Frequencies
 - +22dBm for High Band Frequencies
- **1.8 to 3.6V voltage range (DC/DC, LDO)**
- **-40°C to +105°C temperature range**

STM32WL – Portfolio

Flash memory / RAM size (bytes)



Legend:  In production



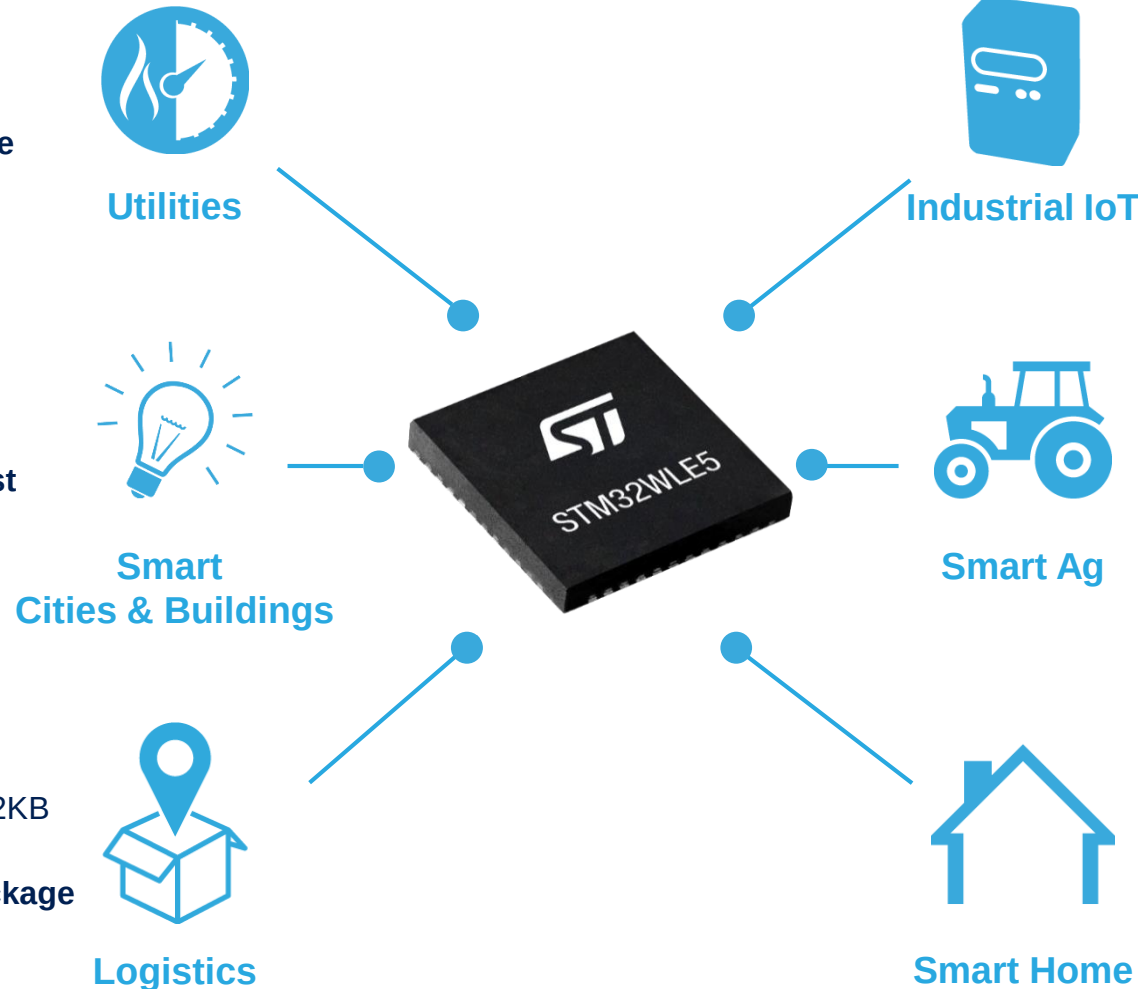
**Up to 43 GPIOs for full flexibility
+
Tiny package footprint**

STM32WL – All In One SubGHz SoC

- Worldwide compatibility **150 MHz to 960 MHz** Linear Range
- Multi-protocol capable
- ST Longevity commitment: **10 years life time**

- Up to +22 dBm output power for wide coverage
- **-148 dBm** sensitivity with LoRa: **Robust RF Link**
- **Reduced BOM cost**

- **Unique-IDs** for enhanced traceability
- Down to 166 nA mode with RTC and 32KB of RAM for extended Battery lifetime
- Small form factor with **UFBGA 5x5 package**



- Up to **105 °C** MCU capable
- **Only 5 µs wakeup time** for best latencies
- Only 5.6 mA as LoRa RX consumption for battery optimization

- Link Budget > **160 dB** = Very long ranges
- Excellent battery lifetime: Only 18.6 mA for LoRa TX consumption @ 10 dBm
- **PCROP, ECC, TRNG, PKA**, for best design robustness

- Down to 63 µA/MHz in Run mode for efficient action
- < 1.1 µA Stop mode with full RAM for **battery life** optimization
- 12-bit ADC & DAC for mixed applicative use cases

STM32WL Coin Cell Battery Enabled!

NAWA offers Li-free power to 'Internet-of-things'



Battery Boost at +/- 20°C

> 40% Size reduction - Flat design

> 35% Gain in operational life time

Lithium free
No shipment restrictions

NAWACap Solution to fit every need



Reference
AA Li-Ion
Battery



AAA +
NAWAcap



Coin Cell +
NAWAcap



Solar Cell +
NAWAcap

AA

Alkaline +
NAWAcap

Bulky

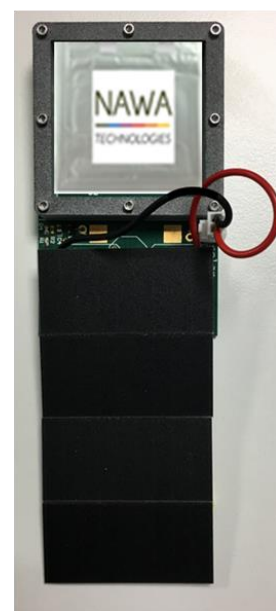
Flatter + Lighter + Smaller

Lithium Free

Side



Top



STM32WB Ecosystem

An addition to the STM32 existing large ecosystem

HW Tools Available

Dev Tools

Stacks

P-NUCLEO-WB55



STM32CubeMX

STM32CubeProgrammer

Free and Partner IDE

STM32CubeMonitorRF



arm KEIL



Bluetooth 5

Thread

ZigBee 3.0

HomeKit*

WorkwithNest*

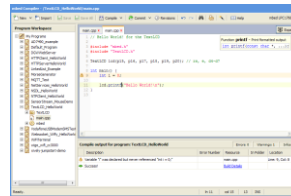
OS

FreeRTOS

mbed

STM32WL Introductory Ecosystem

An addition to the STM32 existing wide ecosystem



STM32 Nucleo-64

Flexible prototyping

Dev tools

STM32CubeMX for configuration
STM32CubeProg
Partners IDE

Stacks

LoRaWAN
Sigfox¹

¹ Coming soon

Important Links

Get Started Today!



st.com/STM32WB



[st.com/STM32WL*](https://st.com/STM32WL)



[st.com/STM32Cube Ecosystem](https://st.com/STM32Cube)

STM32
CubeMX

STM32
CubeProgrammer

STM32
CubeIDE

STM32
CubeMonitor-RF

